

PATENT

Atty Docket No.: 10990172-1
App. Ser. No.: 09/736,654

REMARKS

Favorable reconsideration of this application is respectfully requested in view of the following remarks.

Claims 2, 11, and 22 have been amended and Claims 1 and 21 have been canceled without prejudice or disclaimer of the subject matter contained therein. As such, Claims 2-20 and 22-26 remain pending in the present application, of which, Claims 2, 12, 22, and 24 are independent claims.

No new matter has been introduced by way of the claim amendments; entry thereof is therefore respectfully requested.

Allowable Subject Matter

The Applicants note with appreciation the indication that Claims 2-10, 17-20, 22, and 23 have been objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

By virtue of the amendments above, allowable Claim 2 has been amended to include all of the features of independent Claim 1. In addition, Claim 11 has been amended to depend upon allowable Claim 2 and Claim 1 has been canceled without prejudice or disclaimer of the subject matter contained therein. Therefore, it is respectfully submitted that Claims 2-11 are allowable over the disclosures contained in the cited documents of record.

Moreover, Claim 22 has been amended to include the features of canceled Claim 21. Accordingly, Claims 22 and 23 are also allowable over the disclosures contained in the cited documents of record.

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It is further respectfully submitted that the remaining Claims 12-19 and 24-26 are also allowable over the cited documents of record for at least the reasons set forth herein below.

Claim Rejection Under 35 U.S.C. §102

The test for determining if a reference anticipates a claim, for purposes of a rejection under 35 U.S.C. § 102, is whether the reference discloses all the elements of the claimed combination, or the mechanical equivalents thereof functioning in substantially the same way to produce substantially the same results. As noted by the Court of Appeals for the Federal Circuit in *Lindemann Maschinenfabrick GmbH v. American Hoist and Derrick Co.*, 221 USPQ 481, 485 (Fed. Cir. 1984), in evaluating the sufficiency of an anticipation rejection under 35 U.S.C. § 102, the Court stated:

Anticipation requires the presence in a single prior art reference disclosure of each and every element of the claimed invention, arranged as in the claim.

Therefore, if the cited reference does not disclose each and every element of the claimed invention, then the cited reference fails to anticipate the claimed invention and, thus, the claimed invention is distinguishable over the cited reference.

Claims 1, 11, and 21

Claims 1, 11, and 21 have been rejected under 35 U.S.C. §102(e) as allegedly being anticipated by the disclosure contained in the article titled "Skeletonization via Distance Maps and Level Sets" by Kimmel et al. (hereinafter "Kimmel et al."). This rejection is traversed because it is respectfully submitted that Claims 1, 11, and 21 are patentably distinguishable over the disclosure contained in Kimmel et al. for at least the following reasons.

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As discussed above, independent Claims 1 and 21 have been canceled without prejudice or disclaimer of the subject matter contained therein and their features have been incorporated into respective depending claims. More particularly, the features of Claim 1 have been incorporated into allowable Claim 2 and the features of Claim 21 have been incorporated into allowable Claim 22. In addition, Claim 11 has been amended to depend upon allowable Claim 2.

For at least the foregoing reasons, it is respectfully submitted that the rejection of Claims 1, 11, and 21 have been rendered moot by the amendments above. The Examiner is therefore respectfully requested to withdraw the rejection of Claims 1, 11, and 21.

Claims 12, 15, and 24

Claims 12, 15, and 24 have been rejected under 35 U.S.C. §102(e) as allegedly being anticipated by the disclosure contained in the article titled "Using Resolution Pyramids to Efficiently Store Distance Transforms of Arbitrary Size" by Borgefors (hereinafter "Borgefors"). This rejection is traversed because it is respectfully submitted that Claims 12, 15, and 24 are patentably distinguishable over the disclosure contained in Borgefors for at least the following reasons.

The Official Action asserts that Borgefors discloses all of the features claimed in Claims 12 and 24. More particularly, the Official Action asserts that Borgefors discloses that a first distance map of a source image having a first resolution is downsampled to form a second distance map having a second resolution. The Official Action apparently argues that the alleged "downsampling" of the first distance map to a second distance map is disclosed in the fifth paragraph on page 692 of Borgefors.

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It is respectfully submitted, however, that that cited section in Borgefors fails to disclose that a first distance map is **downsampled** to form a second distance map as claimed in Claims 12 and 24 of the present invention. Instead, that cited section in Borgefors discloses a process of **downscaling** a binary image, such as a black and white image. In fact, there is a relatively large difference between the downsampling disclosed in Claims 12 and 24 and the downscaling disclosed in Borgefors.

As shown, for instance, in FIGS. 9A-9F of the present invention, a first distance map (FIG. 9B) is downsampled to form a second distance map (FIG. 9D) having a different resolution from the first distance map. In other words, the downsampling of the first distance map generally comprises a reduction in the number of samples from the first distance map. Thus, for instance, in going from the first distance map to the second distance map, every second, third, or so on, sample may be retained.

In contrast, the fifth paragraph on page 692 of Borgefors, discloses that a binary image *B* is downscaled in a resolution pyramid, such that the first level "is constructed by letting each block of four pixels in the 0th level be represented by a single pixel...The process is repeated for each new level, until only a single pixel remains at the top level." In other words, Borgefors discloses that the binary image is downscaled by averaging four pixels for each level of the pyramid.

In addition, as disclosed in Claims 12 and 24, a single distance map is computed from the source image and then the single distance map is downsampled to form the second distance map. In contrast, Borgefors performs a downscaling in a grayscale domain, and for each of the downscaled versions, Borgefors computes a different distance map. As such, Borgefors discloses that a plurality of distance maps is created.

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For at least the foregoing reasons, it is respectfully submitted that Borgefors fails to disclose each and every element claimed in Claims 12 and 24. Consequently, Borgefors cannot anticipate the claimed invention as set forth in Claims 12 and 24 and Claims 12 and 24 are considered to be allowable over the disclosure contained in Borgefors. The Examiner is thus respectfully requested to withdraw the rejection of Claims 12 and 24 as allegedly being anticipated by the disclosure contained in Borgefors.

Claim 15 is also allowable over the disclosure contained in Borgefors at least by virtue of its dependency upon allowable Claim 12.

Claim Rejection Under 35 U.S.C. §103

The test for determining if a claim is rendered obvious by one or more references for purposes of a rejection under 35 U.S.C. § 103 is set forth in MPEP § 706.02(j):

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art and not based on applicant's disclosure. *In re Vaack*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

Therefore, if the above-identified criteria are not met, then the cited reference(s) fails to render obvious the claimed invention and, thus, the claimed invention is distinguishable over the cited reference(s).

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Claims 13, 14, 25, and 26

The Official Action sets forth a rejection of Claims 13, 14, 25, and 26 under 35 U.S.C. §103(a) as allegedly being unpatentable over the disclosure contained in Borgefors. This rejection is respectfully traversed because Borgefors fails to disclose the claimed invention as set forth in Claims 12 and 24.

As discussed herein above, Borgefors fails to disclose each and every element claimed in Claims 12 and 24. As such, Claims 12 and 24 are considered to be allowable over the disclosure contained in Borgefors. In addition, Claims 13, 14, 25, and 26 are also allowable over Borgefors at least by virtue of their respective dependencies upon allowable Claims 13, 14, 25, and 26. The Examiner is thus respectfully requested to withdraw the rejection of Claims 13, 14, 25, and 26.

Claim 16

The Official Action sets forth a rejection of Claim 16 under 35 U.S.C. §103(a) as allegedly being unpatentable over the disclosure contained in Borgefors and further in view of the article titled "Euclidean Distance Mapping" by Danielsson (hereinafter "Danielsson"). This rejection is respectfully traversed because Borgefors and Danielsson, considered singly or in combination, fails to disclose the claimed invention as set forth in Claim 16.

Borgefors fails to disclose or render obvious Claim 12 as described herein above. In addition, the Official Action does not and cannot reasonably assert that the disclosure contained in Danielsson makes up for the deficiencies in Borgefors described above. As such, even assuming for the sake of argument that one were motivated to combine the disclosures of Borgefors and Danielsson as suggested in the Official Action, the proposed combination would still fail to yield the present invention as claimed in Claims 12 and 16.

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In addition, Danielsson does not disclose all of the elements of Claim 16, since Danielsson computes distances from pixel centers to centers of boundary pixels that reside on a pixel grid. Pixel centers are known by those of ordinary skill in the art to lie on a rectangular pixel grid with uniform spacing and therefore, the centers of boundary points cannot be considered as being defined to sub-pixel accuracy. In contrast, in Claim 16 of the present invention, the boundary curves may be defined to sub-pixel accuracy, meaning that they are not limited to pass through pixel centers.

Accordingly, the Official Action has failed to establish a *prima facie* case of obviousness of Claims 12 and 16 based upon the cited documents. The Examiner is therefore respectfully requested to withdraw the rejection of Claim 16 and to allow this claim.

Conclusion

In light of the foregoing, withdrawal of the rejections of record and allowance of this application are earnestly solicited.

Should the Examiner believe that a telephone conference with the undersigned would assist in resolving any issues pertaining to the allowability of the above-identified application, please contact the undersigned at the telephone number listed below.

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Please grant any required extensions of time and charge any fees due in connection
with this request to deposit account no. 08-2025.

Respectfully submitted,

Dated: September 30, 2005

By



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